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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,562	12/12/2001	Chang-Lin Hsieh	004544 ALRT/ETCH/DICP	6380

32588 7590 10/15/2003

APPLIED MATERIALS, INC.
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SANTA CLARA, CA 95050

EXAMINER

DEO, DUY VU NGUYEN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 10/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/016,562

Applicant(s)

HSIEH ET AL.

Examiner

DuyVu n Deo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) Filed 12-21-01 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Maex et al. (US 2002/0076935).

Maex describes a method for etching organic low-k insulating layer comprising: providing a dielectric structure comprising a first dielectric layer such as silicon oxide (claimed

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undoped silicon oxide) and a second organic low-k dielectric layer such as BCB, FLARE, SILK (claimed C,H-doped silicon oxide) (paragraphs [0010], [0038], [0084]), etching the dielectric structure using a plasma source gas that comprises nitrogen and fluorine atoms, wherein the second dielectric layer is selectively etched relative to the first dielectric layer (paragraphs [0040], [0057]).

Referring to claims 2-6, the source gas includes NF₃, C₂F₆, CF₄ or mixture thereof and N₂ (paragraph [0040]).

Referring to claims 9 and 10, the plasma etching of the second dielectric layer, described by Maex, would have the same claimed selectivity to the first dielectric layer because the plasma contains the same source gas as that of claimed invention.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 8, 12-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maex as applied to claim 1 above, and further in view of Chen et al. (US 6,573,187).

Maex describes an underlying layer (paragraph [0041]). Unlike claimed invention, he doesn't describe a via dielectric layer of undoped or F-doped silicon oxide over an underlying layer and under the trench dielectric C,H doped silicon oxide. Chen describes a method for

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forming a dual damascene structure having a via dielectric layer of undoped or F-doped silicon oxide 30 over an underlying layer and under the trench dielectric C,H doped silicon oxide 32 such as Flare, Silk, or Black Diamond (col. 2, line 55-65; col. 4, line 50-36). It would have been obvious for one skill in the art to form a dielectric structure in light of Chen because Maex describes the dielectric C,H doped silicon oxide is part of a damascene dielectric stack (paragraph [0084]) and Chen teaches various equivalent dielectric stack in order to form a dual damascene structure with a reasonable expectation of success. Figures 6 and 7 in Chen show the trench is etched through aperture in a patterned masking layer until a portion of upper surface of the via dielectric 30 is exposed for a dual damascene structure.

5. Claims 11 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maex or Maex/Chen as applied to claims 1 and 12 above, and further in view of Tao et al. (US 6,194,128).

Unlike claimed invention, Maex doesn't describe etching the low-k dielectric C,H doped silicon oxide using MERIE system. Tao shows that MERIE is used by one skill in the art for etching the low -k dielectric layer (col. 6, line 18-23). It would have been obvious for one skill in the art to etch the low-k dielectric C,H doped silicon oxide using MERIE system since it is a RIE system and Maex describes that the plasma etch includes RIE (paragraph [0039]).

Information Disclosure Statement

6. The information disclosure statement filed 5/15/03 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that

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portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. The reference JP 2001210627 has not been considered because there is no copy of the foreign reference.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD
9/29/03

NADINE G. NORTON
PRIMARY EXAMINER

